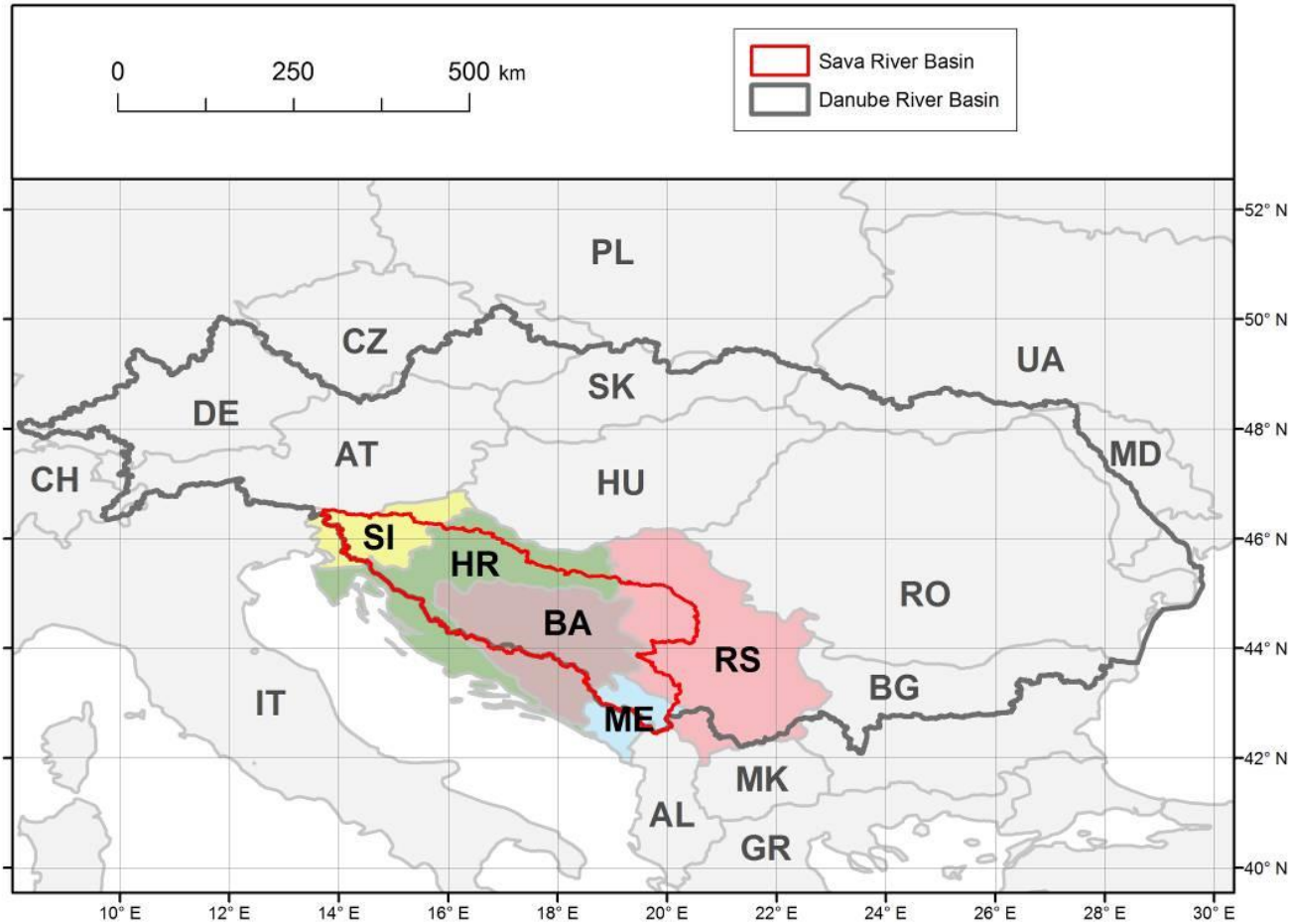


# **Hydrological and meteorological issues in the framework of ISRBC**

WMO RA VI Hydrology Forum,  
Warsaw, 24-26 September 2014

Dr Dejan Komatina,  
Secretary, ISRBC

# Sava river basin



# Legal framework

- **Framework Agreement on the Sava River Basin – FASRB**  
(the first development-oriented multilateral agreement in the region)

- **Key objective:**

**Transboundary water cooperation**  
for **sustainable development** of the region

- **All aspects of water resources management** integrated  
(protection + development)
- Implementation coordinated by the **ISRBC**  
(4 member countries + Montenegro)

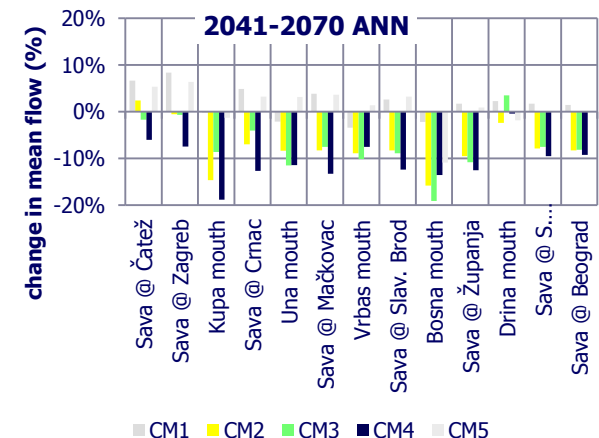
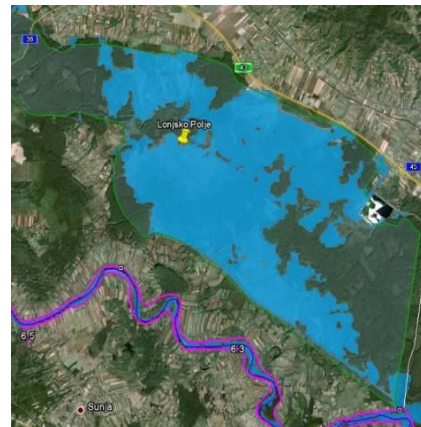
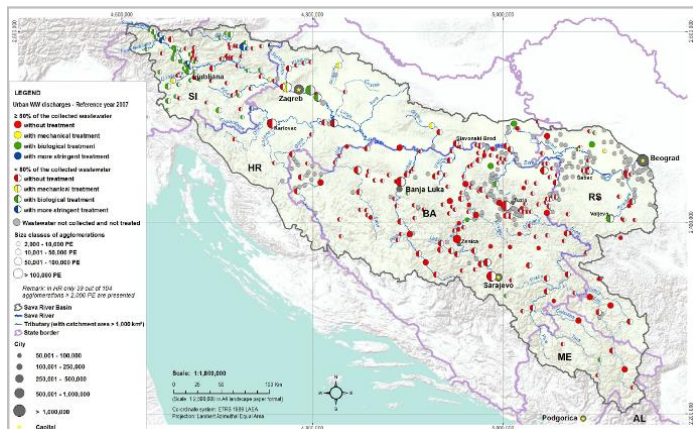
# Institutional framework

- **Int'l Sava River Basin Commission (ISRBC)**
  - The **only subregional mechanism** of water cooperation in the Danube river basin
  - The **broadest scope of work** among int'l basin organizations in Europe
    - Sustainability issues
    - Development issues



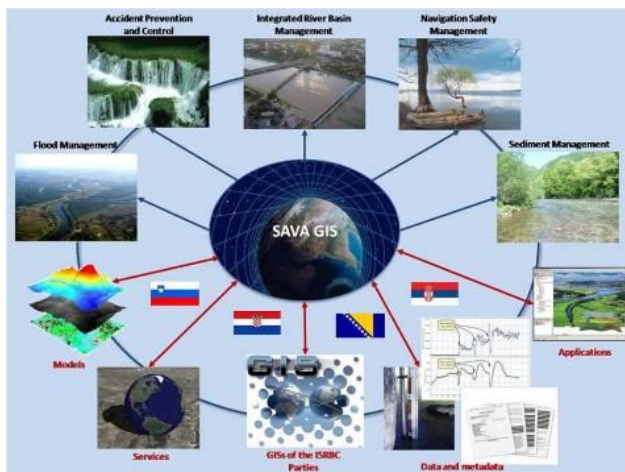
# Activities

- Development of **joint / integrated plans** for the basin
  - **River Basin Management Plan** (according to EU WFD)
  - **Flood Risk Management Plan** (according to EU Flood Directive)
  - Other plans
    - **Water and Climate Adaptation Plan**
    - **Sediment Management Plan**
    - **Water Pollution Contingency Management Plan**



# Activities

- Establishment of **integrated systems** for the basin
  - **Information** systems (GIS, RIS)
  - **Data exchange** system (hydrological and meteorological)
  - **Forecasting and early warning** systems (floods, accidents involving water pollution)



INTERNATIONAL SAVA RIVER BASIN COMMISSION  
Međunarodna komisija za oba rijeka Save

HOME SAVA RIVER BASIN CONTACTS WEBSITE

Hydrological stations with daily observation  
Tuzilsko, 7 December 2010, at 7:00

**Hydrological stations with daily observation**

**Bosnia and Herzegovina**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Dirctie of discharge	Temp. °C
Sava	Čašćani Most	830	830	0	483	10	3.2
Sava	Čašćani	830	830	-5	2127	8	3.7
Sava	Sibac	830	830	-1	26	-	3.8
Una	Most Grad. str.	830	830	-8	483	-	3.2
Una	Most Grad. str.	830	830	-5	2127	-	3.7
Sava	Prigodac	830	830	-1	26	10	3.8
Sava	Brnjak Most	830	830	114	483	8	3.2
Ubaša	Donja Ubaša	830	830	50	2127	-	3.7
Ubaša	Dobričani Ubaša	830	830	-8	26	-	3.8
Bijela	Dubok	830	830	-8	483	-	3.2
Vrbasja	Vrbasja	830	830	-1	2127	10	3.7
Drava	Prilac str.	830	830	-8	26	8	3.8

**Croatia**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Dirctie of discharge	Temp. °C
Sava	Janjina 2	830	830	0	483	10	3.2
Sava	Zagreb	830	830	-5	2127	8	3.7
Sava	Emac	830	830	-1	26	-	3.8
Sava	Janjina	830	830	-8	483	-	3.2
Sava	Načičevac	830	830	-8	2127	-	3.7
Sava	Donac	830	830	-1	26	10	3.8
Sava	St. Brnd	830	830	114	483	8	3.2
Sava	St. Šimeon	830	830	50	2127	-	3.7
Sava	Zagreb	830	830	-8	26	-	3.8
Sutla	Zabok	830	830	-5	483	-	3.2
Krupina	Krupina	830	830	-1	2127	10	3.7
Kupa	Kupčina	830	830	-8	26	8	3.8
Kopa	J. Kraljica	830	830	-5	483	-	3.2
Una	Končanina	830	830	-1	2127	-	3.7

**Serbia**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Dirctie of discharge	Temp. °C
Sava	Janjina	830	830	0	483	10	3.2
Sava	S. Njivevica	830	830	-5	2127	8	3.7
Sava	Sibac	830	830	-1	26	-	3.8
Sava	Beograd	830	830	-8	483	-	3.2
Drava	Kuduf	830	830	-5	2127	-	3.7
Una	Prigodac	830	830	-1	26	10	3.8
Kuharsa	Veljevo	830	830	114	483	8	3.2
Kuharsa	Novac	830	830	50	2127	-	3.7
Kuharsa	Draževac	830	830	-8	26	-	3.8
Uga	Brigovana	830	830	-5	483	-	3.2
Temerara	Čukarica most	830	830	-1	2127	10	3.7

**Slovenia**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Dirctie of discharge	Temp. °C
Lipitovnica	Učnja 1	830	830	0	483	10	3.2
Savinja	Valiči Srpa 1	830	830	-5	2127	8	3.7
Krka	Prilac	830	830	-1	26	-	3.8
Sava	Kuharska 1	830	830	-8	483	-	3.2

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# Activities

- Development of water-related **economic activities** in the basin (Navigation, River tourism, Hydropower use)
- Harmonization of **regulation** (national → EU)
- Creation of additional **protocols to the FASRB**



# Links to national institutions

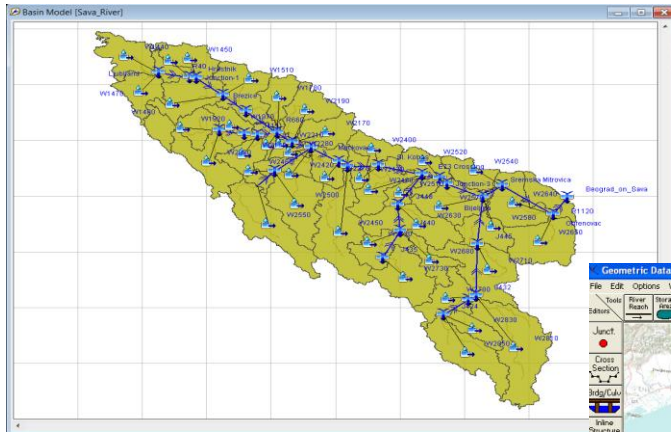
- Institutions **officially nominated by the governments** (mostly ministries)
- **NHMSs**
  - **Expert Group for HM issues** – all members come from the NHMSs
  - **Annual meetings** with directors of the NHMSs and WMO representatives
- **Water agencies** and other institutions



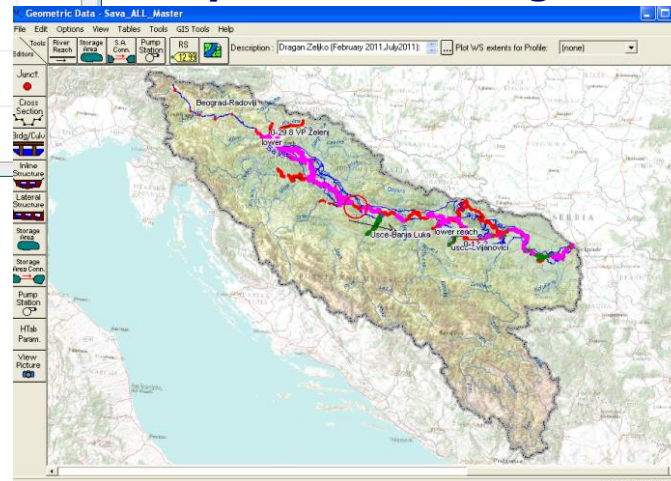
# FRM & Climate Adaptation Plans

- Modelling**

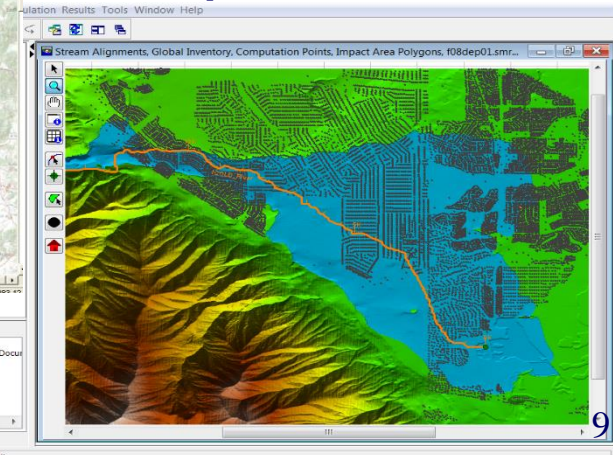
## Hydrologic modelling



## Hydraulic modelling

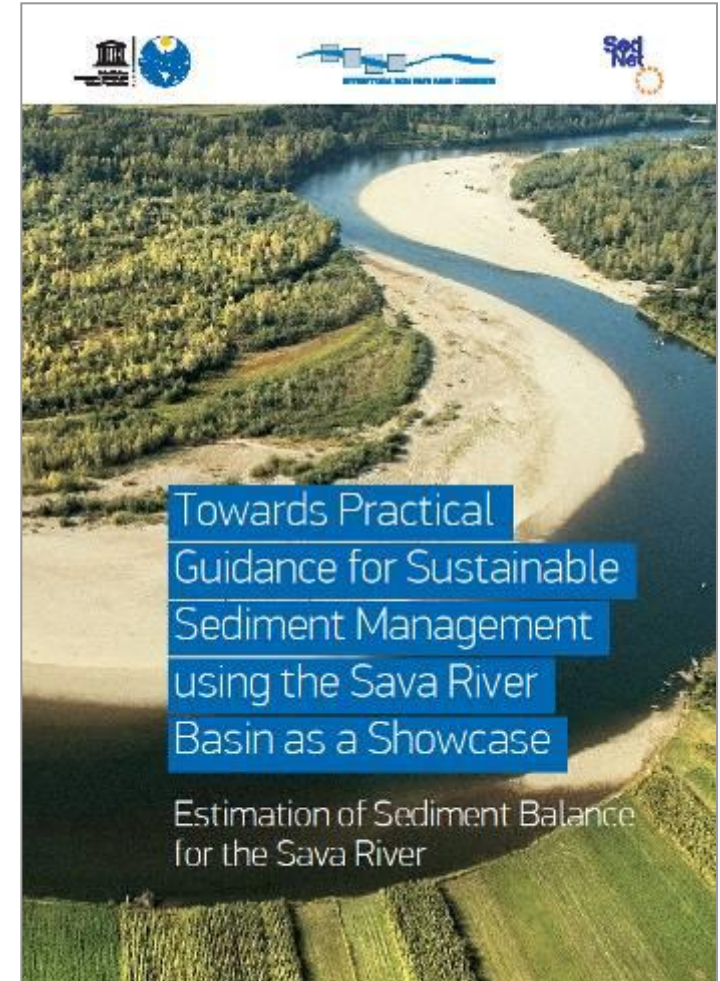


## Consequence assessment



# Sediment Management Plan

- **Draft Guidance** on Sustainable Sediment Management
- **Draft Implementing Program** for preparation of the Plan
- Estimation of **Sediment Balance** for the Sava River



# Data sharing

- **Hydrological Yearbook of the Sava River Basin**
  - HY 2006 – the **first since 1986**
  - **HY 2006 – 2010** available on the ISRBC web-site
  - **HY 2000 – 2005 and HY 2011** under preparation
  - Data for **Montenegro** included



# Data sharing

- **Data exchange system**


- **Data portal**

- 4 hydro and 5 meteo parameters
    - 41 hydro and 45 meteo stations
    - **Data automatically downloaded** from national databases at certain intervals and **presented** on the ISRBC web-site

- **Planned upgrades**

- Storing data
    - Visualisation of data

- **Development of Sava HIS planned**



INTERNATIONAL SAVA RIVER BASIN COMMISSION  
Međunarodna komisija za sâv rijeku Sava

Activities » Hydrological stations with daily observation  
**Hydrological stations with daily observation**  
Tuesday, 7 December 2010, at 7:00

**Bosnia and Herzegovina**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Decide of discharge	Temp. °C
Sava	Sanski Most	838	838	-8	483	10	3.2
Sava	Gradiska	838	838	-5	2127	8	3.7
Sava	Srbac	838	838	-1	26	-	2.8
Una	Novi Grad-NEV	838	838	-9	483	-	3.2
Una	Novi Grad-NEV	838	838	-9	2127	-	3.7
Sana	Prjedor	838	838	-1	26	10	2.8
Sana	Donji Ribnik	838	838	164	483	8	3.2
Vrba	Banja Luka	838	838	50	2127	-	3.7
Vrba	Dubalacina Selo	838	838	-9	26	-	2.8
Bosna	Dobo	838	838	-5	483	-	3.2
Vrbasja	Vrbasja	838	838	-1	2127	10	3.7
Drina	Kula-NEV	838	838	-9	26	8	2.8

**Croatia**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Decide of discharge	Temp. °C
Sava	Jasenice 2	838	838	-8	483	10	3.2
Sava	Zagreb	838	838	-5	2127	8	3.7
Sava	Ornac	838	838	-1	26	-	2.8
Sava	Jasenovac	838	838	-9	483	-	3.2
Sava	Medvevac	838	838	-5	2127	-	3.7
Sava	Davor	838	838	-1	26	10	2.8
Sava	Sl.Brod	838	838	164	483	8	3.2
Sava	Sl.Samac	838	838	50	2127	-	3.7
Sava	Županja	838	838	-9	26	-	2.8
Sutla	Zelenjak	838	838	-5	483	-	3.2
Krapina	Kupljenovo	838	838	-1	2127	10	3.7
Kupa	Karlovac	838	838	-9	26	8	2.8
Kopa	J.Krnjica	838	838	-5	483	-	3.2
Una	Kostajnica	838	838	-1	2127	-	3.7

**Serbia**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Decide of discharge	Temp. °C
Sava	Zemena	838	838	-8	483	10	3.2
Sava	S. Petrovica	838	838	-5	2127	8	3.7
Sava	Sibin	838	838	-1	26	-	2.8
Sava	Beograd	838	838	-9	483	-	3.2
Drina	Kadaj	838	838	-5	2127	-	3.7
Lim	Prjegrpolje	838	838	-1	26	10	2.8
Kolubara	Valjevo	838	838	164	483	8	3.2
Kolubara	Slovac	838	838	50	2127	-	3.7
Kolubara	Drazevac	838	838	-8	26	-	2.8
Topl	Biogradac	838	838	-5	483	-	3.2
Tamanas	Čemernov most	838	838	-1	2127	10	3.7

**Slovenia**

River	Hydrological Station	Water level (cm)	Water level changes (cm)	Water level tendency (cm)	Discharge (m <sup>3</sup> /s)	Decide of discharge	Temp. °C
Ljubljanica	Hosto 1	838	838	-8	483	10	3.2
Savinja	Velika Sija 1	838	838	-5	2127	8	3.7
Krka	Podbačja	838	838	-1	26	-	2.8
Sava	Radovljica 1	838	838	-9	483	-	3.2

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# Data sharing

- **Data and information exchange policy**
  - Provides **principles** needed for exchange
  - Defines a **minimum level** of exchange (HY + Data Portal)
  - Developed **with support of WMO**
  - **Signed** by **NHMSs** and **water agencies**



# Data sharing

- **Flood forecasting and warning system**
  - Project idea **formulated by NHMSs** in 2003
  - System **development in phases** agreed (2009)
  - **Funding approved** for the 1<sup>st</sup> phase (2014)
  - **Project partners** to include NHMSs, water agencies and ministries
  - A flexible platform will be used, to accommodate **different models** used in the countries



# Other activities

- **Joint measurements at border areas**
  - **Objective:** to align the results
  - **Implementation** started in 2013
  - **Planned activities**
    - Develop plan of the measurements for proximate year
    - Organize comparative measurements according to available funds
    - Define locations and contact persons for implementation of targeted measurements (e.g. in case of floods)
- **Hydrological Study for the Sava River Basin**
  - The latest one **developed in 1976**

# Key messages

- **Solid legal and institutional basis**  
(FASRB & protocols, ISRBC & network of inst.)
- **Commitment of Parties** on a high level  
(ISRBC sessions, Meeting of the Parties)
- **Excellent cooperation** with the NHMSs

